Policy, Research, and External Affairs

WORKING PAPERS

Macroeconomic Adjustment and Growth

Country Economics Department
The World Bank
April 1990
WPS 400

Macroeconomic Constraints for Medium-Term Growth and Distribution

A Model for Chile

Andrés Solimano

A formal model that identifies the major macroeconomic constraints to maintain sustainable growth is specified and parameterized for the Chilean economy. The model is also used to explore the macro effects of policies addressing poverty and income distribution issues.

Policy, Research, and External Affairs

WORKING PAPERS

Macroeconomic Adjustment and Growth

This paper — a product of the Macroeconomic Adjustment and Growth Division, Country Economics Department — is part of a larger effort in PRE to develop applied macroeconomic models to support the design of adjustment programs. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Emily Khine, room N11-062, extension 39361 (43 pages with figures and tables).

Solimano uses this model to examine policies geared to reducing poverty and improving income distribution patterns in terms of their macroeconomic impact on the Chilean economy. He concludes that in a capacity-constrained environment:

- An unbalanced increase in government spending (in the social sectors) of 3 percent of potential GDP will slow down the rate of GDP growth by 1 percent.

- Reducing interest payments abroad by 3 percent of GDP would accelerate the rate of GDP growth by 1.7 percent, reduce the real exchange rate by 8.1 percent, and increase real wages 6.6 percent.

- A cut in the mark-up rate of 4 percent would increase both external competitiveness and real wages, allowing the rate of capacity utilization to increase 1.4 percent. Inflation would be reduced 4 percent on impact.

- The balance of payments and fiscal budget can be considered binding if a turnaround in copper prices takes place, as many observers predict.

- The level of productive capacity seems to be a main macroeconomic constraint for expansionary demand policies, at least in the short to medium run. An increase in savings and investment is crucial to sustained growth.

- Inflation is currently moderately low in Chile, but as the economy hovers around full capacity utilization and growth remains high, inflationary pressures may be mounting.

Produced at the PRE Dissemination Center

TABLE OF CONTENTS

This paper was presented in the UNU/WIDER Conference on "Medium-term Development Strategies" held in Oslo, Norway on October 12-14, 1989. Comments made by Bela Balassa, Andrés Gomez Lobo and Lance Taylor are acknowledged.

1. Introduction

The recovery of the Chilean economy since the mid eighties, has certainly been successful in macroeconomic terms. In fact, the restoration of growth and the correction of external imbalances after the severe economic crises of 1982-1983 has taken place in a macroeconomic environment of moderate inflation, without major fiscal imbalances, exports have expanded significantly and foreign debt burden indicators have improved. However, distributive and poverty related indicators show this is an area of pending problems. The share of the population under the poverty line is quite sizeable, Torche (1987); a finding also supported in other studies, Rodriguez (1985) and Pollack-Uthoff (1986). The real minimum wages and other low skilled workers wages (like construction) have deteriorated significantly even though the observed reduction in unemployment has ameliorated these effects on total labor income. Therefore, it appears as a major challenge to maintain sustainable rates of economic growth, address the social issues of reducing poverty and improving income distribution patterns, while preserving macroeconomic and financial stability.

The purpose of this paper is to examine analytically what are the main macroeconomic constraints to achieve those goals in the Chilean economy. The paper is organized as follows. In section 2 we present a formal macroeconomic model that identifies the major constraints (external, savings and fiscal) that shape the scope for growth.

The model, in turn, introduces the distinction between demand constrained, capacity constrained and inflationary growth regimes under which different macroeconomic policies may have distinct effects on growth and distribution.

In Section 3 the model is numerically calibrated with parameters of the Chilean economy. This procedure allow us to parameterize the foreign, savings and fiscal constraints, or gaps, and to quantify the major trade-offs. Then three policy exercises, or shocks, are explored with the model: i) an increase in public spending (in social sectors) of 3% of potential GDP; ii) A reduction of interest payments abroad of 3% of potential GDP; and iii) a reduction in the mark-up rate of 4%. Those policies are carried out under different growth regimes (more emphasis is given to the capacity constrained-growth regime in order to reflect the limits imposed by existing productive capacities on the possibilities of pursuing expansionary demand policies).

Moreover, these policies are evaluated in terms of their impact on the rate of GDP growth, the rate of capacity utilization, the real exchange rate, real wages, and the rate of inflation. Finally, the paper concludes in Section 5.

Table 1

Chile: Macroeconomic Indicators

	GDP (growth rate) %	capacity utilization (index)	Investment rate (% of GDP)	Current Account (% of GDP)	rate of inflation (%)	Public Savings (% of GDP)
1981	5.7	100.0	19.5	- 14.5	9.5	
1982	- 14.7	77.6	15.0	- 9.5	20.7	- 0.9
1983	- 0.8	74.9	12.9	- 5.7	23.1	0.0
1984	6.3	81.8	13.2	- 10.7	23.0	0.5
1985	2.4	83.4	14.8	- 8.3	26.4	3.7
1986	5.7	87.6	15.0	- 6.5	17.4	4.6
1987	5.5	91.4	16.5	- 4.8	21.1	5.3
1988	7.4	95.7	17.0	- 0.7	12.7	5.6

Source: Chilean National Accounts and Balance of Payments Statistics Central Bank of Chile (1988). The index of capacity utilization draws from Marfán and Artiagoitía (1989).

Table 2

Chile: Distributive and Social Indicators

	Real Wages (index)	Real Minimum Wages (index)	Unemployment rate (1)	(2)	Gini coeff.	Real Wages constr.
			percentages			
1981	100.0	100.0	10.4	15.1	52	100.0
1982	99.9	101.0	19.6	26.1	54	94.9
1983	89.0	81.0	18.7	31.4	54	71.0
1984	89.0	70.0	15.9	24.0	55	61.4
1985	88.0	66.0	16.0	24.2		51.5
1986	87.0	64.0	13.9	19.1		47.8
1987	87.0	60.0	12.6	15.8		46.9
1988	93.0	63.0	10.2			

Source : Cepal (1989), Arellano (1988), Larrain (1989), Solimano (1988) .
(1) open unemployment rate. (2) open unemployment rate plus emergency employment programs.

Tables 1 and 2 suggest some important features of the current macroeconomic and social situation that may be important for shaping the growth possibilities of the Chilean Economy.

i) After five years in which the Chilean economy has been growing at an average rate of 5.5% per year, (1984 -1988), with a fairly low investment rate (15.2% of GDP on average), the question arises on the feasibility of sustaining those rates of growth over the medium term without a major increase in investment. In particular when the margins of unused capacity are narrow as it seems to be the case by the late eighties (see the second column in Table 1, and

consider that the rate of growth of GDP for 1989 is estimated in about 10 percent).

ii) Concerning the sources of savings to finance the investment effort, it is apparent from looking at Table 1 that the contribution of foreign savings has been steadily declining since the crises of 1982-83. Moreover, a major reversal of this trend is unlikely given the current credit constraints in international capital markets. On the other hand, the share of public savings has been increasing in the same period, in an attempt to compensate the fall in the foreign savings share.

iii) Inflation in Chile has been moderately low during the adjustment process (it averaged 19% per year between 1981-88). At least if compared to other Latin American economies in the same period. In addition, in 1988 inflation was near to the one digit level. However, as the economy approaches a high rate of capacity utilization and current growth is high, inflationary pressures may be mounting. Hence these pressures could also be considered as a potential macroeconomic constraint for high growth, at least if we are interested in maintaining inflation at moderate levels.

iv) The distributive and social indicators worsened significantly during the adjustment process, although the situation have improved since 1988 . Therefore, a demand for action in this field certainly exist. The room for social policies and distributive moves is conditioned, to a great extent, by how tight (or relaxed) the external, saving and capacity constraints are and by the state of the public finances. In particular, as mentioned before, the absence of excess capacity in the aggregate reduces the room for a policy of increases in real wages, likely to have an expansionary impact in a demand constrained situation (see Solimano 1988). On the other hand, the external constraint and

the need to generate sizeable trade surpluses for foreign debt servicing also poses ceilings on the wage policy that are important to bear in mind.

The fiscal situation is currently in good shape to accommodate increases in government spending with a social content; however, different fiscal instruments should be used to maintain (or even increase) the current levels of public savings since they constitute an important source of financing public and aggregate investment.

In the next section, we specify the macro model that will permit us to quantify the growth constraints and the impact of different policies.

2. A Simple Macroeconomic Model with Growth

In this section we shall specify a simple macroeconomic model that explicitly incorporates growth into the analysis. The model is a blend of a three-gap model (besides the traditional savings and foreign gap a fiscal gap is now introduced as a -potentially-additional constraint to growth, see Bacha, 1989 and Taylor, 1988) with a disequilibrium model (Solimano, 1988) extended to deal explicitly with capital formation and growth. A departure from Bacha - Taylor is that some key relative prices like the real wage and the real exchange rate are not fixed but are allowed to change.

The analysis distinguishes between different "growth-regimes," where the regimes are classified as demand constrained, capacity constrained and inflationary growth regimes. Every regime, in turn, describes the macroeconomic environment in which the growth process takes place. Analytically this may prove to be a useful way to link the short and the medium run and it is also intended to show how different policies can affect the rate of growth in

distinct ways, depending upon the dominant regime in the economy.

The model first identifies which are the main macroeconomic constraints to growth following the traditional distinction between the external constraint (or foreign gap), the savings constraint (or internal gap) and the novel fiscal constraint whose meaning will be discussed later.

The next step is to provide a behavioral content to the main equations of the model. Then, we specify which variables endogenously adjust to bring macro equilibrium and which variables are taken as exogenously determined. The closure rule adopted is what defines the growth-regime.

Let us start, first, with the national accounts identity between investment and savings.

$$(1) \qquad (Y - C) + (T - G) + (M - X) = I$$

where: Y is output (GDP), C is private consumption, T is current revenues of the government, G is government consumption, M represents total imports, X are total exports and I is gross investment.

Introducing net factor payments abroad, R^*, (which includes interest payments on foreign debt) and assuming that a share q of the debt is owed by the private sector and a share 1-q by the government, $0 < q < 1$, equation (1) can be written as :

$$(2) \qquad (Y - C - qR^*) + (T - G - (1-q)R^*) + (M - X + R^*) = I$$

Redefining terms, S_p is national savings equal to $Y - C - qR^*$. S_g is public savings equals to $T - G - (1-q)R^*$ and Sf is foreign savings, namely the deficit in the current account, $M - X + R^*$. Therefore,

$$(3) \qquad S_p + Sg + S_t = I$$

Equation (3) is the saving constraint. Investment, as a share of potential GDP, $i=I/y$, is related to the rate of potential GDP growth, $g = \delta y/y$, through the following equation

$$(4) \qquad g=g_o + ki$$

where k is an incremental output-capital ratio and g_o is a term reflecting labor-productivity growth and the effects of supply shocks.

Private national savings, is made a function of disposable national income : $YD = Y(1-t) - qR^*$. Expressing the saving function, (relative to potential GDP) $s_p=S_p/y$, as a linear function of national disposable income.

$$(5) \qquad s_p=a_o + s_1[(1-t)u - qr^*]$$

where $u= Y/y$ is the level of capacity utilization and t is the average direct tax rate and $q\ r^*$ is the part of interest payments abroad served by the private sector, as a share of potential GDP.

Public saving, in turn, can be decomposed as S_g = (taxes + net surplus of public enterprises + net transfers) - (current consumption + interest payments on public debt). Public savings as a ratio of potential output, $s_g = S_g/y$, shall be made a linear function of the level of capacity utilization. Tax revenues and operational profits of public enterprises are assumed to rise with u.

(6) $$s_g = b_o + b_1 u$$

Foreign saving, the current account deficit (in dollars), s'_f, as a ratio of potential output, may be written as the sum of imports of capital goods, m_k, imports of intermediate goods, m_z, and imports of consumption goods, m_c minus total exports, x, plus net factor payments abroad, r'^*. (All lowercase variables, are expressed as ratios of potential GDP).

(7) $$s'_f = m_k + m_z + m_c - x + r'^*$$

Imports of capital goods, is written as a function of the rate of growth of potential GDP, g, and the real exchange rate (perhaps with a low elasticity in the short run, in the case of capital goods not produced at home), defined as $e_r = e\ p^*/p$, where e is the nominal exchange rate, p^* is international prices and p is the price of domestic goods.

(8) $$m_k = f_o + f_1 g + f_2 e_r \qquad f_1 > 0,\ f_2 < 0$$

Imports of intermediate goods, normalized by y, are made a function of the real exchange rate and the level of capacity utilization

(9) $$m_z = h_c + h_1 e_r + h_2 u \qquad h_1 < 0\ ,\ h_2 > 0$$

Adopting a similar specification for the imports of consumption goods,

$$(10) \qquad m_c = j_o + j_1 e_r + j_2 u \qquad j_1 < 0 \ , \ j_2 > 0$$

Total exports, in turn, will be a positive function of the real exchange rate, e_r, and the level of world demand, Y^*.

$$(11) \qquad x = v_o + v_1 e_r + v_2 Y^* \qquad v_1 > 0 \ , \ v_2 > 0$$

The balance of payments (normalized by potential output) may be written as $B/y = F/y - s'_f$ where B represents international reserve accumulation, F denotes net capital inflows and s'_f was defined as the (normalized) current account deficit, all in dollar terms. Plugging equations (8), (9), (10), (11) and (7) into the balance of payments definition we obtain the **foreign exchange constraint:**

$$(12) \quad F/y - B/y = s'_f = c_o + c_1 e_r + c_2 u + c_3 g + r'^* + c_4 Y^*$$

Equation (12) represents the constraint imposed by the balance of payments on the level of economic activity and the rate of growth of GDP when the availability of foreign exchange is a binding restriction in the system. In turn, the coefficients in (12) correspond to $c_o = f_o + h_o + j_o - v_o$, $c_1 = f_2 + h_1 + j_1 - v_1$, $c_2 = h_2 + j_2$, $c_3 = f_1$ and $c_4 = v_2$.

As the current account, s'_f, is denominated in dollar terms, the sign of the coefficient c_1, denoting the impact of a real depreciation on the current account deficit, is non-positive. (i.e., $c_1 < 0$). Namely a real depreciation will improve (or at least not deteriorate) the dollar value of the current

account of the balance of payments. The current account in (domestic currency) could deteriorate after a real devaluation if the deficit is initially large or the trade elasticities are too low.

In order to focus on the constraints to growth, we shall solve equation (12) for the rate of growth of potential GDP.

$$(13) \quad g_f = 1/c_3 \{ s'_f - c_0 - c_1 e_r - c_2 u - r'^* + c_4 Y^* \}$$

g_f is the maximum rate of growth of potential GDP that a foreign exchange constrained economy could afford in order to satisfy the restriction imposed by the balance of payments. In this setting, an increase in interest payments abroad, a rise in r'^*, shall reduce growth because of the lower availability of foreign exchange to finance imports of capital goods. A real depreciation, i.e $\delta e_r > 0$, allows to accelerate the rate of growth of GDP since it provides extra foreign exchange through increasing net (of capital goods) exports. Conversely an increase in the level of capacity utilization, i.e., as a consequence of following expansionary demand policies, will tend to increase the imports of current goods, for a given level of net foreign financing and exports, that amounts to a cut in imports of capital goods and growth. i.e., $\delta g_f / \delta u < 0$.

The saving constraint, in turn, includes foreign savings in domestic currency. Normalized by the level of potential output, the equation for foreign saving in domestic currency, $s_f = S_f/y$, may be written as -

$$(14) \quad s_f = w_0 + w_1 e_r + w_2 u + w_3 g + w_4 Y^*$$

where w_0 picks up the intercepts of equations (8)-(11), included the term representing net factor payments abroad in domestic currency relative to potential GDP , $r^*=R^*/y$. The coefficient w_1 will be assumed to take a value less than zero, $w_1 < 0$, namely a real depreciation of the exchange rate will reduce the current account deficit in domestic currency. Furthermore $w_2 > 0$ and $w_3 > 0$, $w_4 < 0$.

The condition savings equals investment, or saving gap, given by equation (3), normalized by the level of potential output, can be written as -

$$(15) \qquad i = s_p + s_g + s_f$$

Combining equations (4), (5) , (6) and (14) and plugging them into equation (15) gives rise to the saving constraint expressed in terms of the rate of growth of potential output.

$$(16) \qquad g_s = (k/1-kw_3) \{ d_0 + d_1 e_r + d_2 u \}$$

where g_s is the maximum rate of growth of potential GDP consistent with the saving constraint. In turn, $d_0 = g_0/k + a_0 + b_0 + w_0 - a_1 q r^*$, $d_1 = w_1 < 0$ and $d2 = a_1(1-t) + b1 + w2 > 0$.

A stability condition is that $kw_3 < 1$. From our previous assumption that $w_1 < 0$, a real devaluation will reduce growth if the savings constraint is binding and output is at full capacity, say $u = 1$. This result is due to the reduction in foreign savings following the real devaluation not compensated with an increase in domestic savings. Looking at it from the demand side, given Y=y

(full capacity utilization), an increase in net exports following a real depreciation has to be accommodated through a reduction in investment that slows growth. Conversely, if output or the rate of capacity utilization are allowed to vary, in a keynesian fashion, a real devaluation that increases net exports and output, will not necessarily crowd-out investment and slow growth since domestic saving will rise along with u .

Up to this point we have stated the foreign exchange and the savings constraints, let us turn now to the **fiscal constraint**. This constraint intends to reflect the impact of the availability of fiscal resources to finance public investment required to support a given rate of GDP growth.

Another dimension of fiscal deficit lies in its effects on macroeconomic stability in particular on inflation and the balance of payments. In this perspective, the fiscal constraint may be interpreted as a "constraint of macroeconomic stability," considering a stable macro environment as a requisite for sustainable growth.

A useful way to write the fiscal constraint is in terms of Public Sector Borrowing Requirements, PSBR, since it includes public investment and then it can be linked to the GDP growth rate. Using lowercase notation to denote variables normalized by the level of potential output:

$$(17) \qquad psbr = i_g - s_g$$

where psbr =PSBR/y is the ratio of public sector borrowing requirements and potential GDP; in turn, $i_g=I_g/y$ is the ratio of public investment to potential GDP and $s_g = Sg/y$ represents public sector savings as was previously defined.

To solve the fiscal constraint in terms of the rate of growth of

potential GDP let decompose total investment, relative to potential GDP, i, into the sum of private investment, i_p, and public investment, i_g.

$$i = ip + i_g \tag{18}$$

Now, making private investment a function of the level of public investment and the level of capacity utilization.

$$i_p = i_o + \alpha i_g + \beta u \tag{19}$$

The sign of the coefficient α shall depend on whether public investment crowds-in or crowds-out private investment. Typically, in LDC's, government investment in infrastructure like roads, ports and the like is expected to be complementary with private investment. On the other hand, some public investment may be competitive with private investment. If the former effect is dominant α is positive, conversely if crowding-out effects were dominant α would turn negative. The parameter β is expected to be positive, since an increase in the rate of capacity utilization (an indicator of demand conditions in the economy) will have a stimulative effect on private investment.

Now, replacing (19) in (18) we can write -

$$i = i_o + (1+\alpha)\, i_g + \beta u \tag{20}$$

Inserting equation (20) in (4) and solving for i_g yields

$$i_g = 1/k(1+\alpha)\ \{\ g - g_o - k(i_o + \beta u)\ \} \tag{21}$$

Replacing equation (21) in (17) and solving for g we obtain -

$$(22) \quad g_g = k(1+\alpha)\ \{\ psbr + b_0 + (g_0/k + i_0)/1+\alpha + (b_1 + \beta/1+\alpha)\ u\ \}$$

where g_g is the maximum rate of potential GDP growth consistent with the fiscal constraint defined in terms of a certain (psbr) public sector borrowing requirement target. In this context a relaxation of the fiscal constraint, e.g., the psbr coefficient increase, channeled towards an increase in public investment will increase the rate of GDP growth (we are assuming that $1+\alpha > 0$). Another result is that increases in u, the rate of capacity utilization, shall accelerate g_g, since net revenues and therefore public savings increase then providing more resources to finance higher public investment and support more growth.

The price level in the model is given by -

$$(23) \quad p = (1+\tau)(\mu\ w + \phi\ e\ p^*)$$

where τ is the (constant) mark up rate, μ is the labor -output coefficient w is the nominal wage rate, ϕ is the foreign input component of a unit of output and ep^* is the domestic currency price of foreign inputs.

Dividing both sides of equation (23) by p and solving for w/p we obtain a monotonic inverse relationship between the real wage and the real exchange rate given the mark-up rate and the technical input-output coefficients.

$$(24) \quad w/p = 1/\mu\ \{\ 1/1+\tau - \phi\ ep_*/p\ \}$$

Summarizing, the model can be reduced to five equations: the foreign exchange constraint equation (13), the savings constraint equation (16), the fiscal constraint represented by equation (22), equation (24) is the relationship between the real wage and the real exchange rate. The inflation sector of the model is presented below, equations (26) and (27) and is represented in semi-reduced form by equation (28). These equations, in turn, are solved for the rate of growth of GDP, g , the level of capacity utilization, u , the real exchange rate, ep^*/p , the real wage, w/p , and the inflation rate, π.

Let us turn now to the three regimes defined in the model: the first one is a fix price -excess capacity regime where w, p, e are fixed ($\pi = 0$) and the system is solved for g and u. This regime will be labeled as a **demand constrained-growth regime**, where growth takes place in an economy operating with excess capacity. One way to solve the system in this regime would be through the min. condition, for a given u.

(25) $$g = \min \{g_f, g_s, g_g\}$$

Another way to solve the system in the demand constrained regime is to obtain simultaneously a solution for g and u assuming fix the real wage, the real exchange rate and the price level. This retains the fix price spirit of the disequilibrium models where, in a Keynesian fashion, quantities adjust (included now the rate of potential GDP growth).

The second regime represents the case of an economy operating at full capacity $u = 1$, where wages and prices are flexible (e is fixed or predetermined by the exchange rate system). This situation corresponds to the

capacity constrained-growth regime where the growth process takes place in an economy operating at full capacity. In a model with different savings propensities between labor and capital, full capacity utilization and nominal wages adjusting slower than prices, this would correspond to a forced savings regime where changes in income distribution towards high savings groups is the adjusting mechanism to assure full capacity, see Taylor (1988).

A third regime we explore is an inflationary - growth regime in which growth occurs in a macro setting characterized by inflation and disequilibrium (or slow adjustment) in the goods market à la Phillips curve. Inflation, in this open economy, is a weighted average between the rate of growth of nominal wages and the rate of growth of the domestic price of imported inputs (the rate of devaluation plus foreign inflation). Formally, differentiating equation (24) and assuming a constant mark up rate, yields:

$$(26) \qquad \pi = \Omega \hat{w} + (1-\Omega)(\hat{e} + \pi^*)$$

where $\pi = \delta p/p$, $\hat{w} = \delta w/w$, $\hat{e} = \delta e/e$ and $\pi^* = \delta p^*/p^*$. In turn, the parameter Ω denotes the share of labor in unitary costs and $1-\Omega$ is the share of intermediate inputs.

The wage equation in rate of growth form is endogenous in the model and depends on current inflation and the degree of excess demand (or supply) in the goods market.

$$(27) \qquad \hat{w} = \sigma\pi - \epsilon(1-u)$$

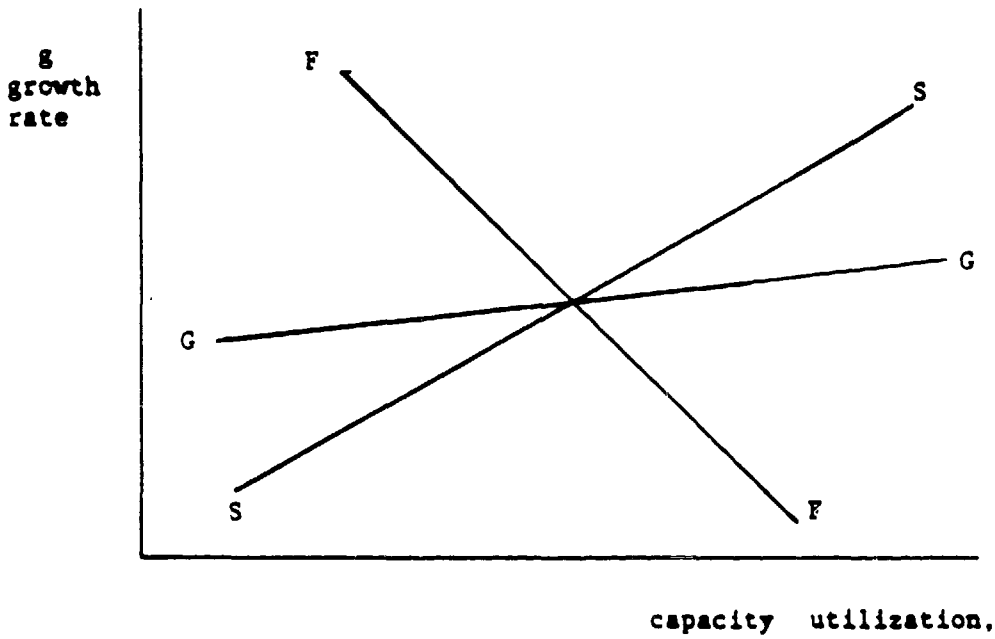
where σ is a wage indexation coefficient and ϵ measures the sensitivity of nominal wages growth to degree of slack or excess demand in the goods market,

measured through deviations of current capacity utilization from full capacity use (u=1). Plugging equation (27) into (26) we arrive to the following expression for the rate of inflation:

$$(28) \qquad \pi = 1/1-\Omega\sigma \; \{ \; \Omega\epsilon(u-1) + (1-\Omega)(\hat{e} + \pi^*) \; \}$$

In general this regime may be consistent both with a demand constrained or a capacity constrained situation in the goods market. Figure 1 to 3 show the graphical solution of the model for each growth-regime and the comparative static is developed in next section with an empirical application to Chile.

Figure 1: Demand constrained - growth regime



The downward sloping FF schedule represents the external constraint, equation (13), in the space (g,u) for given values of the real exchange rate and interest payments abroad. It is negatively sloped since an increase in u

raises current goods imports, reducing the resources available to import capital goods hence forcing to cut-down growth, $\delta g_e/\delta u < 0$. The SS schedule representing the saving gap, equation (16), is upward sloping since an increase in u rises domestic savings generating more resources to invest, $\delta g_s/\delta u > 0$.

The GG schedule is the fiscal constraint, equation (22), is also positively sloped since an increase in the rate of capacity utilization increases net revenues of the government, thus producing more resources to finance a higher level of public investment that could support more rapid growth. On the other hand, the schedule is assumed to be flatter than the SS schedule.

The equilibrium solution for g and u arises from the intersection of the three schedules SS, FF and GG. In case these lines do not intersect at the same point, some assumption is needed with respect to which gap is not binding in the system in order to avoid an overdetermined system.

Figure 2. Capacity constrained-growth regime

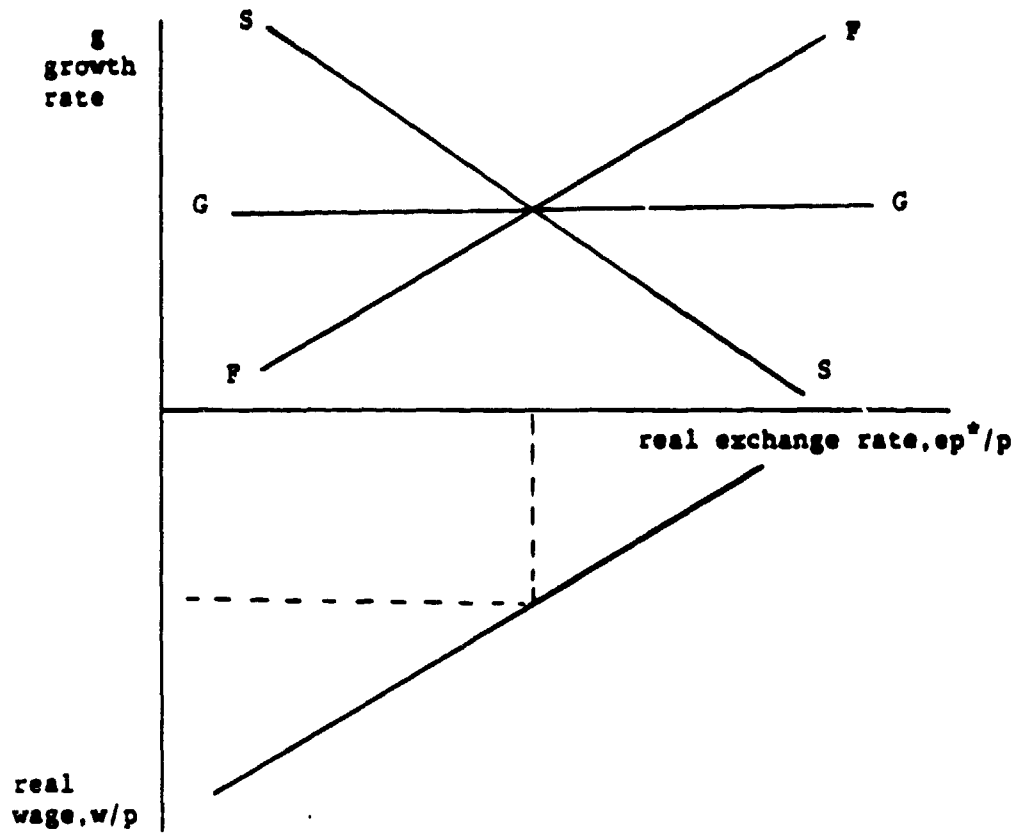


Figure 2 represents the capacity constrained-growth regime in the space g and e_r (in this regime capacity utilization is fixed, u = 1). The FF schedule is positively sloped now, reflecting the positive effect of a real depreciation on the availability of foreign exchange that allows to finance a higher level of capital goods imports and support more rapid growth. The SS schedule is negatively sloped since a real depreciation is assumed to reduce the deficit in the current account, cutting foreign savings. Then a lower level of investment (and growth) is required to maintain savings = investment. Finally, the GG schedule is an horizontal line, independent of e_r.

In the bottom part of Figure 2 we draw the relationship, in level form, between real wages and the real exchange rate, equation (24). The relationship is negative e.g., a real depreciation implies a cut in real wages, as far as the mark-up and the input-output coefficients in the price equation remain fix. An improvement in productivity or a reduction in the mark-up would allow a real depreciation of the exchange rate - a gain in external competitiveness - that need not to be accompanied by a squeeze in real wages.

Figure 3. Inflationary-growth regime

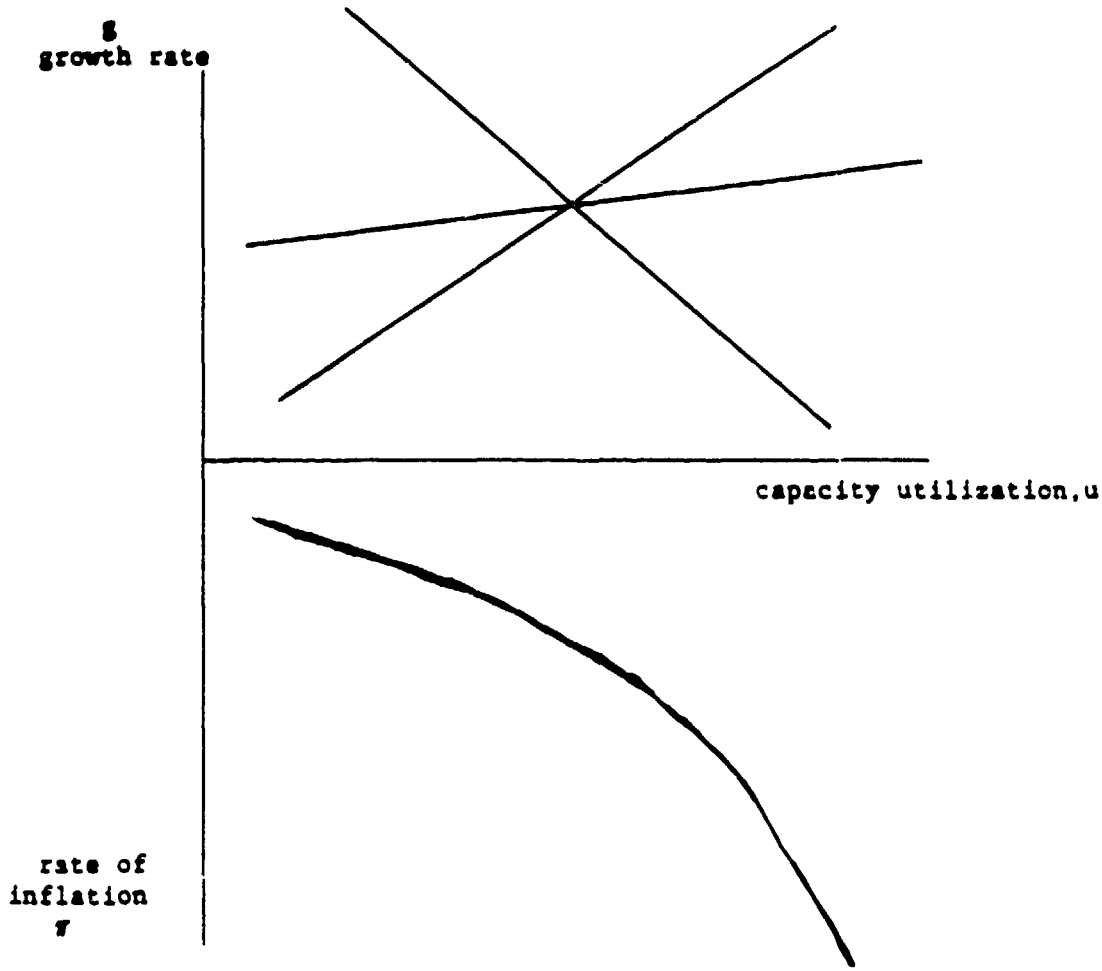


Figure 3 represents the inflationary-growth regime. The upper part of this figure corresponds to the demand constrained regime and the bottom part displays the relationship between the rate of inflation and the rate of capacity utilization, equation (28), given a rate of devaluation and foreign inflation. The slope of the schedule gets steeper (worsening the trade-off between inflation and the level of capacity utilization) as the economy approaches full capacity utilization, wage growth respond more to and increase in u and/or the degree of wage indexation increases in the economy.

3. A Numerical Calibration of the Model for Chile

In this section the model specified in the previous section is calibrated. The calibration procedure uses coefficients from three sources: i)econometric estimates of some key functions (like import and export equations, investment equations, price equations, ii) values calculated directly from time series or iii) assumed plausible coefficient values. To assure consistency to the base year values coming from National Accounts and Balance of Payments Statistics (that base year is 1987) the constant terms of the model's equations are adjusted so as to replicate that year. The appendix documents the initial values of the variables of the model and some parameters used to estimate the growth constraints and other relationships of the model.

Let us turn now to the parameterization of the model. Taking 1981 as a year of "full" capacity utilization for the Chilean economy and assuming an annual rate of growth of capacity output of 1.5% we obtain a rate of capacity utilization for 1987 of 0.946 (a little bit higher than the estimated for that year in Marfán and Artiagotía, 1989). The output-capital ratio , k , is .333 so the implied ICOR is 3.0. The accelerator coefficient in the investment function, ß, is 0.059 and the crowding-in parameter, α, is - 0.23 (Zucker, 1988). The parameterization of the private sector savings rate function is $s_p = - 0.087 + 0.16\ u$, for the public savings rate is $s_g = - 0.046 + 0.1\ u$ (note that negative intercepts imply marginal savings rates for private savings and public sector net revenues that exceed averages propensities). The foreign savings rate function, in domestic currency, is $s_f = 0.136 + 0.34\ e_r + 0.645\ i + 0.487\ u - 0.314\ Y^*$. These equations show (recall the model is stated in terms of shares) that a 1% increase in the rate

of capacity utilization increases private savings by 0.16% and public savings by 0.1% (a flatter GG schedule than the SS locus in the g,u space, Figure 1).

The foreign savings equation, in turn, shows that a real depreciation of 10% shall reduce the current account deficit by 3.4%. On the other hand, a 1% increase in the capacity utilization ratio will increase the current account deficit in 0.645%. Combining these equations (private, public and foreign savings rates) we obtain the savings constraint. Solving for the rate of growth of GDP yields

$$g_s = 0.010 - 0.318\ e_r + 0.699\ u - 0.294\ Y^*.$$

In terms of the Figure 1 notice that a real depreciation shifts downward the SS schedule. Given u this means that a real devaluation of the exchange rate reduces growth when the savings gap is binding.

Turning to the foreign gap, or balance of payments constraint, the parameterized equation is

$$g_f = - 0.064 + 0.198\ e_r - 0.251\ u + 0.161\ Y^*.$$

It is downward sloping in the space g,u but the terms of the trade-off between capacity utilization and growth seem to be not too severe (-0.251) along the foreign exchange gap. A real depreciation, in turn, shifts upward the FF schedule allowing a higher rate of GDP growth given u. Which effect dominates? It is clear that the downward shift of the SS schedule following a real devaluation is larger than the upward shift in FF (-0.318 versus + 0.198). This is an important result since it suggest that a real depreciation reduces growth in the demand constrained-growth regime given the parameters values used for Chile. In this respect, the mirror image of a real devaluation, namely a cut in real wages, would decelerate growth (but increase capacity utilization) in the case the saving gap shift is dominating, see Figure 4. However, if the

economy were foreign exchange constrained, in the sense that the upward shift in FF dominates, the opposite result for the rate of growth of potential GDP will be obtained; namely a cut in real wages would accelerate growth). Therefore, a demand constrained-growth regime is consistent both with an accelerationist or stagnationist response of growth to a cut in real wages. The final result will depend on the specific parameters values that make the saving gap or the foreign gap effect to dominate following a cut in real wages.

Turning to the parameterization of the fiscal constraint we get $g_g = 0.010 + 0.049\ u$. Then, it is apparent that the trade-in coefficient between u and g along the fiscal gap is quite small.

The inflation equation is parameterized as $\pi = 0.55\ \hat{w} + 0.45\ (\hat{e} + \pi^*)$, where the mark-up rate as well as the input-output coefficients are assumed to be constant. From this equation the relationship between real wages and the real exchange rate, in log-change form, is $\hat{w} - \pi = -0.81\ (\hat{e} + \pi^* - \pi)$. Then a real devaluation of 10% will reduce real wages by 8.1% holding the mark-up and the input-output coefficients as fixed.

The wage equation is $\hat{w} = 0.7\ \pi + 0.25\ (1-u)$. This assumes an indexation coefficient of 0.7 for nominal wages and a coefficient of response of nominal wages to the output gap of 0.25. Combining the structural equation of inflation with the wage equation we get the following semi-reduced equation for the rate of inflation $\pi = 0.223\ (u - 1) + 0.731\ (\hat{e} + \pi^*)$. It is interesting to note that the sensitivity of inflation to the output gap is rather moderate (0.223). However, we can expect that the effect of an increase in capacity utilization on inflation depends also on how close the economy is to full capacity, mainly trough an increase in the response of nominal wages growth to a higher rate of capacity utilization in the goods market. In fact,

that parameter could be specified as a positive function of u, say $\delta\epsilon/\delta u=\epsilon(u)$, $\epsilon'>0$. This consideration may become important in the Chilean case as a high level of capacity utilization may start to generate inflationary pressures that will be underestimated if predicted with parameters corresponding to a macro regime with more slack. (Pressures to change the wage indexation coefficient could also be observed if inflation accelerate, though for the current levels of inflation in Chile these pressures may not be very serious yet).

Finally, it is worth to mention that the coefficient that measures the impact of changes in the rate of devaluation on inflation (0.731) is much higher than the coefficient of the output gap (a feature appearing also in other empirical studies on inflation in Chile, Corbo, 1985 and Jadresic 1985). Therefore, it is important to be aware that the exchange rate policy is bound to have a quantitatively significant effect on the rate of inflation in Chile.

4. Policy Exercises

With the model parameterized we are in conditions to carry out some policy exercises for Chile. As discussed at some length, the model flavour is that the qualitative effects of different policy instruments are regime-dependent; therefore we have to make some assessment on the dominant growth regime under which the policy exercises take place. As Table 1 in the first section shows the Chilean economy in 1988 operated with little excess capacity, and less so in 1989, getting close to what we have termed as a capacity constrained-growth regime. Then the exercises are carried out, mainly under this regime. Furthermore, for the sake of completeness the demand constrained and inflationary regimes are also explored.

An increase in public spending (in social sectors) of 3% of potential GDP

The first exercise we are dealing with is an increase in current public spending of 3% of (potential) GDP directed to social sectors. According to Larraín's (1987) calculations this would be the approximate magnitude of the required initial internal transfer to low income groups in order to allow them (in a period of 5 years) to get above the poverty line and satisfy their basic needs requirements in terms of food, housing and basic services.

Table 3 summarizes the effect of an increase in 3 percent of potential GDP of public spending in the capacity constrained growth regime.

Table 3

Effects of an increase in public spending of 3% of (potential) GDP. (Capacity constrained-growth regime)

	base year solution (1)	solution with a 3% increase in the government spending share (2)	difference (2) - (1) percentage (3)
rate of growth of GDP, %	6.43	5.36	- 1.07
real exchange rate (index)	110.27	104.88	- 5.39
real wages (index)	100.00	104.36	4.36
rate of growth of GDP % under a dominant fiscal constraint	5.90	5.26	- 0.64
a balanced increase increase in public spending (matched by an increase in fiscal revenues of 3 points of GDP)	6.43	6.43	0.0

A main result of Table 3 is that an (unbalanced) increase in the public spending share of 3% slows the rate of growth of GDP by 1% . This effect is due to the reduction in public savings (taxes and/or other type of public spending remain unchanged in this simulation). The fall in public savings, in turn, leads to a reduction of domestic savings that forces (given foreign savings) to cut aggregate (and public) investment and decelerate growth. As displayed in Figure 4 the increase in government spending shifts

backward the SS locus (at a given real exchange rate, the rate of growth g has to be lower to accommodate a lower level of domestic saving). Given the FF schedule the system gets a new equilibrium with both lower growth and a lower real exchange rate. The real appreciation is 5.4% (given a fixed nominal exchange rate, domestic prices have to fall to preserve goods market equilibrium at full capacity). On the other hand, real wages rise by 4.4% (see bottom part of Figure 4) and labor enjoys higher real wages but slower employment growth. In terms of income distribution, labor and low income groups are expected to benefit from higher social spending.

In the case the fiscal gap is binding the slowdown in GDP growth is - 0.6%, given a public sector borrowing requirements target. However, it is worth mentioning the simulation in the bottom of Table 3, that shows that a fully balanced increase in public spending; that is, an increase in expenditure matched by an equivalent increase in fiscal revenues -- for example due to an increase in income taxes or the value added tax -- will not affect the rate of growth of GDP because fiscal savings remain unchanged in a balanced fiscal expansion at full capacity.

A main lesson of this exercise is that in order to avoid a trade-off between income distribution (pursued through an unbalanced fiscal expansion) and growth in a capacity-constrained economy, it is necessary to avoid a reduction in government savings. Since the terms of the trade -off are not trivial, this will require to finance the additional public spending in social sectors with increased taxation and/or reduced government spending in other sectors.

Debt Relief: a reduction in interest payments on foreign debt

A second policy exercise we will explore here is a reduction in interest payments abroad of 3% of potential GDP; either as a consequence of cutting the effective interest rate paid on existing debt and/or because the country obtains a reduction in its outstanding principal as a part of a comprehensive debt relief scheme.

In terms of our model this policy shall affect the three constraints. The external gap is relaxed in proportion to the improvement in the current account associated with the 3% reduction in r'^*. To determine the impact of the interest payments reduction on the other two gaps we make the assumption that 2/3 of the fall in r'^* is shared by the public sector (that amounts to 2% of potential GDP) and 1/3 (say 1% of potential GDP) is shared by the private sector.

The fiscal constraint is relaxed in proportion to the increase in government savings associated with the reduction in public debt servicing abroad. Given a value of the psbr (public sector borrowing requirements), this leaves room for an increase in public investment. The saving constraint improves because public savings increase, the transfer abroad is reduced and the private sector saves more. The latter in response to the perceived increase in real disposable national income as a consequence of lower interest payments serviced by the private sector. In addition, this effect could be greater if a cut in taxes is envisaged, following the reduced obligations of the public sector with foreign creditors.

Table 4

Effects of a reduction in interest payments abroad of 3% of (potential) GDP. (capacity constrained - growth regime)

	base year solution (1)	solution with a 3% reduction in interest payments abroad. (2)	difference (2) - (1) percentage (3)
rate of growth of GDP %	6.43	8.1	+ 1.67
real exchange rate (index)	110.27	102.13	- 8.14
real wages (index)	100.0	106.6	+ 6.6
rate of growth of GDP % under a dominant fiscal constraint	5.9	6.55	+ 0.65

As Table 4 shows, the gains in terms of acceleration in the rate of GDP growth following the 3% of GDP reduction in interest payments abroad are significant: 1.67%. On the other hand, the real exchange rate appreciates in 8.14% and real wages rise by 6.6% (the mark-up is held constant). In terms of figure 5 both the SS and the FF schedules shift upward. The fall in the equilibrium real exchange rate is due to the relatively larger shift in FF because of the improvement in the current account following the reduction in interest payments abroad. Clearly there is an improvement in the standard of living reflected in both higher real wages and accelerated growth.

The public finances also improve, and provided the resources released from reduced public debt servicing are channeled towards an increase in public

investment, the rate of growth of GDP accelerates by 0.67% when the fiscal gap is binding.

A reduction in the mark-up rate of 4 percent.

The last exercise we explore is a reduction in the mark- up rate of 4%. This distributive cum competitiveness-enhancing policy may be accomplished through a cut in tariffs or by rising profit taxes. Incidentally, a cut in mark-ups is qualitatively equivalent in its impact on prices to a cut in indirect taxes i.e., a reduction in the value-added tax rate, as was done in Chile in 1988. Of course, the distributive and fiscal effects may be different.

To trace out the macro effects of the reduction in the mark-up we need first to define how it is distributed between higher real wages and a higher real exchange rate. For simplicity we shall assume that both increase in the same proportion, say 4 percent. This satisfies our price equation (28) written in rate of growth form, modified to allow for a change in the mark-up, formally:

$$- \delta (1+\tau) / (1+\tau) = \Omega(\hat{w} - \pi) + (1-\Omega)(\hat{e} + \pi^* - \pi)$$

where $\hat{w} - \pi = \hat{e} + \pi^* - \pi = 0.04 = - \delta (1+\tau)/1+\tau = - (-0.04)$

The exercise will be carried-out in a demand constrained-inflationary growth regime as depicted in figure 6; whose numerical values (base year and policy solution) are shown in Table 5.

Table 5

Effects of a reduction in the mark-up rate of 4%
(demand constrained-inflationary growth regime)

	base year solution (1)	solution with a 4% reduction in the mark-up rate (2)	difference (2) - (1) percentage (3)
rate of growth of potential GDP %	5.65	6.0	0.35
rate of capacity utilization (index)	95.00	96.4	1.4
real exchange rate (index)	100.0	104.0	4.0
real wages (index)	100.0	104.0	4.0
rate of inflation on impact	17.1	13.1	-4.0
"permanent"	17.1	17.4	0.3

As Table 5 shows a reduction in the mark-up by 4% increases moderately the rate of growth of potential GDP, 0.35%, and increases the rate of capacity utilization by 1.4%. Growth accelerates because of the positive effect of the induced real depreciation on foreign exchange availability and imports of capital goods, dominates over the negative effect of the lower current account deficit on aggregate savings. In terms of Figure 6, the outward shift in FF, the foreign gap locus, outweighs the downward shift in the SS schedule or savings gap. On the other hand, the expansionary effect of the cut in the mark-up - the rate of capacity utilization rise in 1.4% -- is due to the positive

effect of increased investment and net exports (external competitiveness rises) on aggregate demand and output.

What happens with inflation following the reduction in the mark-up ? The base year model solution for inflation is $\pi = 0.223\ (u-1) + 0.731\ (\hat{e} + \pi^*)$ equal to 17.1% for u= 0.95, $\hat{e}$= 0.20 and π^* = 0.05. Maintaining the same rate of devaluation and foreign inflation, the "permanent" increase in inflation is 0.3% (π = 17.4%) and is associated to the new (higher) rate of capacity utilization.

However, inflation is reduced "on impact" (given the initial rates of capacity utilization, devaluation and foreign inflation) due to the cut in the mark-up rate; inflation being equal to π = 17.1 - 4.0 = 13.1 percent.

5. Conclusions

The preceding analysis provides a framework to examine the macroeconomic constraints for sustained growth in a small open economy. A three gap model framed in a disequilibrium setting that distinguishes between demand constrained, capacity constrained and inflationary-growth regimes is the framework used for that purpose.

The model is calibrated with parameters for the Chilean economy and used to examine the effects of various macro policies with some distributive content. The main results can be summarized as follows:

i) An unbalanced increase in government spending (in social sectors) of 3% of potential GDP, will slowdown the rate of growth in GDP by 1% in a capacity constrained-growth regime. The cut in government savings is the driving force behind this result, given a certain current account deficit. In turn the real

exchange rate appreciates (5.4%) and real wages rise (4.4%) after the increase in public spending. The adverse side effect on growth of this transference program could be avoided with an increase in taxation or a reduction in other public spending items.

ii) A reduction of interest payments abroad of 3% of GDP, in a capacity constrained situation, would accelerate the rate of GDP growth by 1.7%, reduce the real exchange rate by 8.1% and increase real wages in 6.6 percent. An improvement in the current account, along with a relaxation of the fiscal and saving gaps, gives rise to the acceleration in growth. The new equilibrium in the goods market and the balance of payments requires now a lower real exchange rate therefore allowing a higher real wage.

iii) A cut in the mark-up rate of 4% increases external competitiveness and real wages simultaneously, allowing the rate of capacity utilization to increase by 1.4% and growth of potential GDP to accelerate by 0.35% (demand constrained regime). Finally inflation, "on impact," would be reduced by 4%.

iv) In regard to the macro constraints for the Chilean economy in the years ahead the balance of payments and the fiscal budget can be considered as binding if a turnaround in copper prices take place as many observers predict. On the other hand, the level of productive capacity seems to be also a main macroeconomic constraint for expansionary demand policies at least in the short to medium run (in 1989 in the aggregate, no idle capacity seemed to exist). Therefore, an increase in savings and investment is of paramount importance to support growth on a sustained basis. Finally, inflation is currently at moderately low levels in Chile, however as the economy hovers around full capacity utilization and growth keeps high, some inflationary pressures may be mounting, a trend not to be disregarded in any medium term assessment of the

Chilean economy.

Figure 4. Effects of an increase in public spending of 3% of potential GDP (capacity constrained-growth regime)

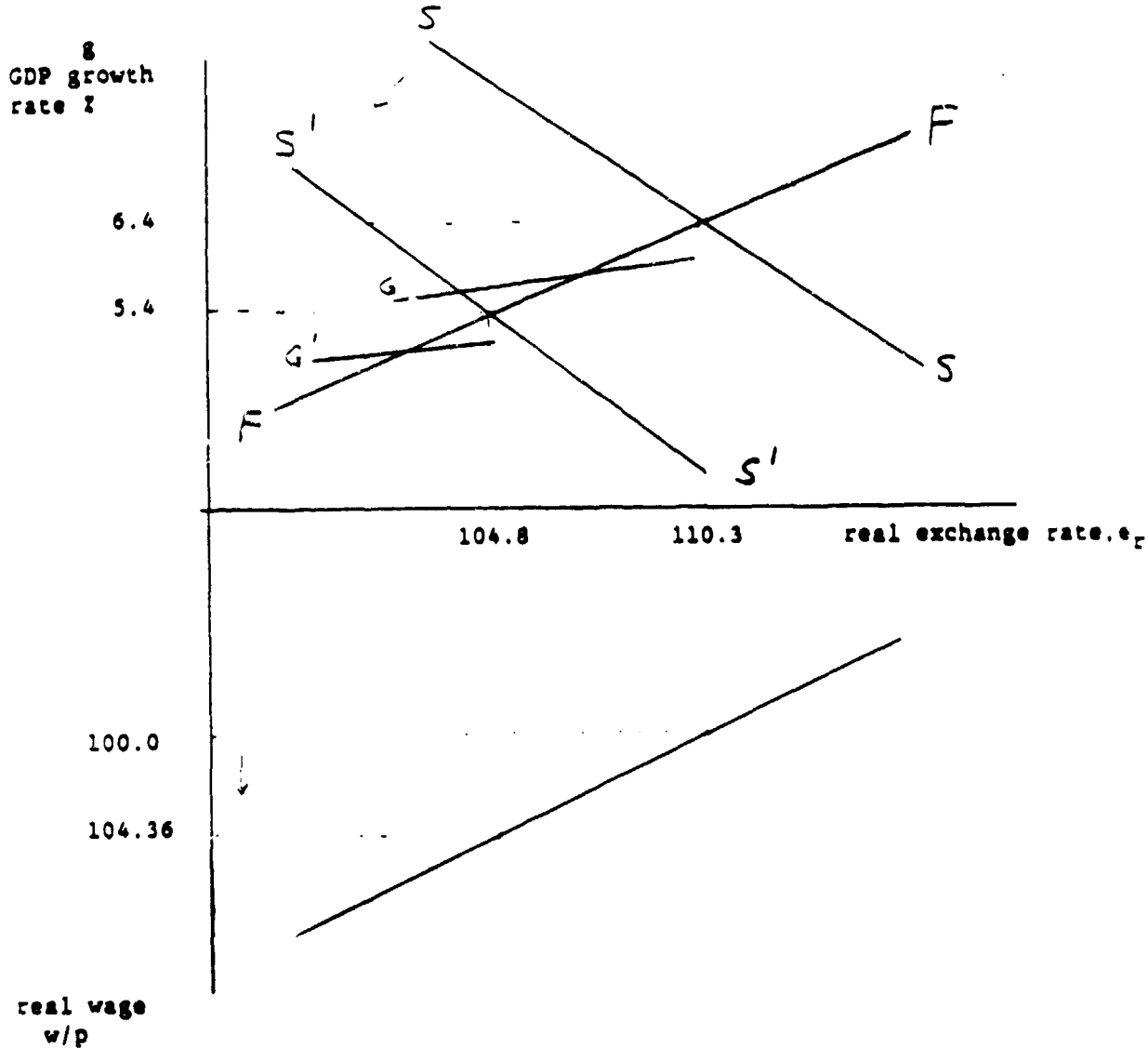


Figure 5. Effects of a reduction in interest payments abroad of 3% of potential GDP (capacity constrained growth regime)

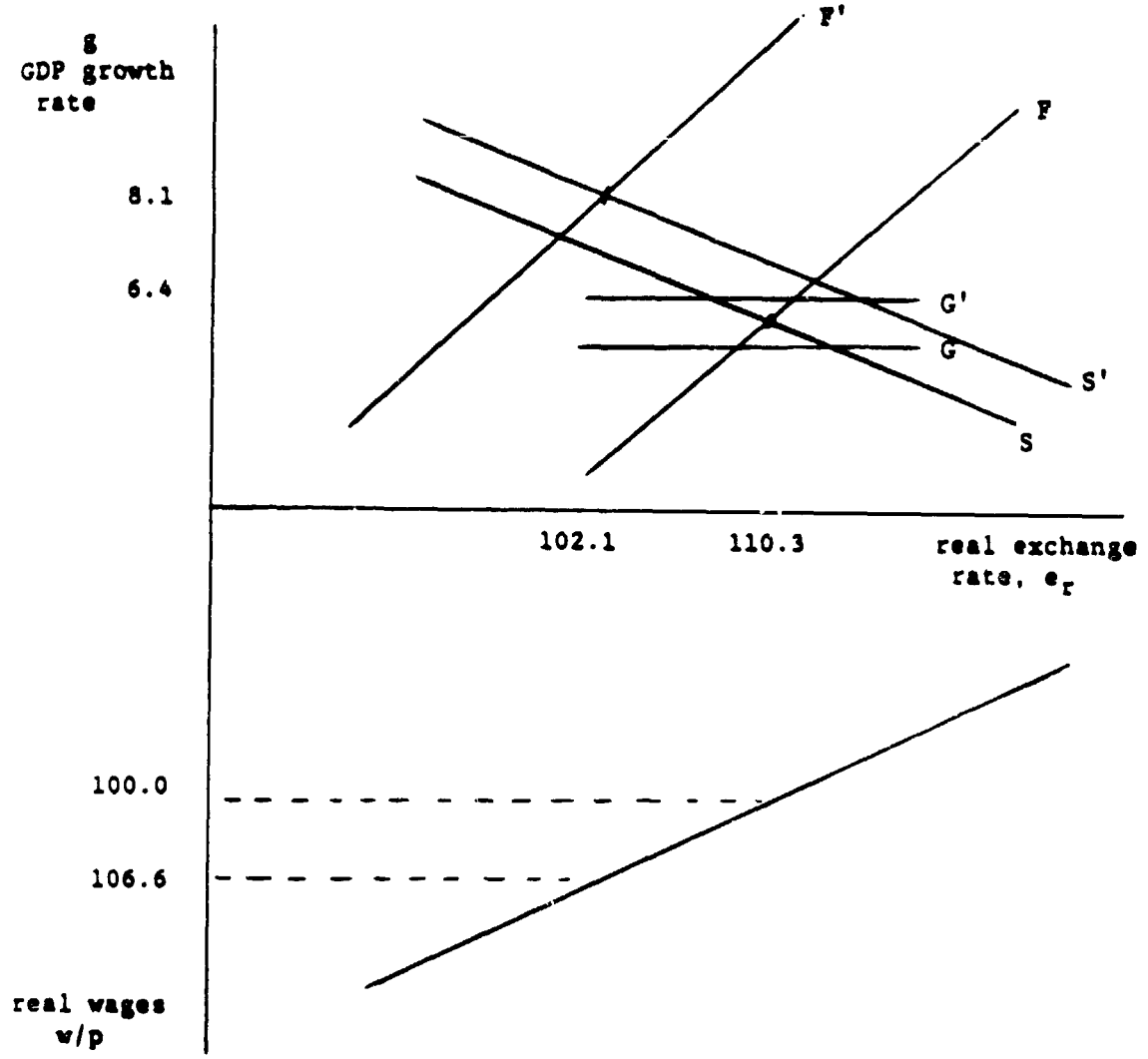
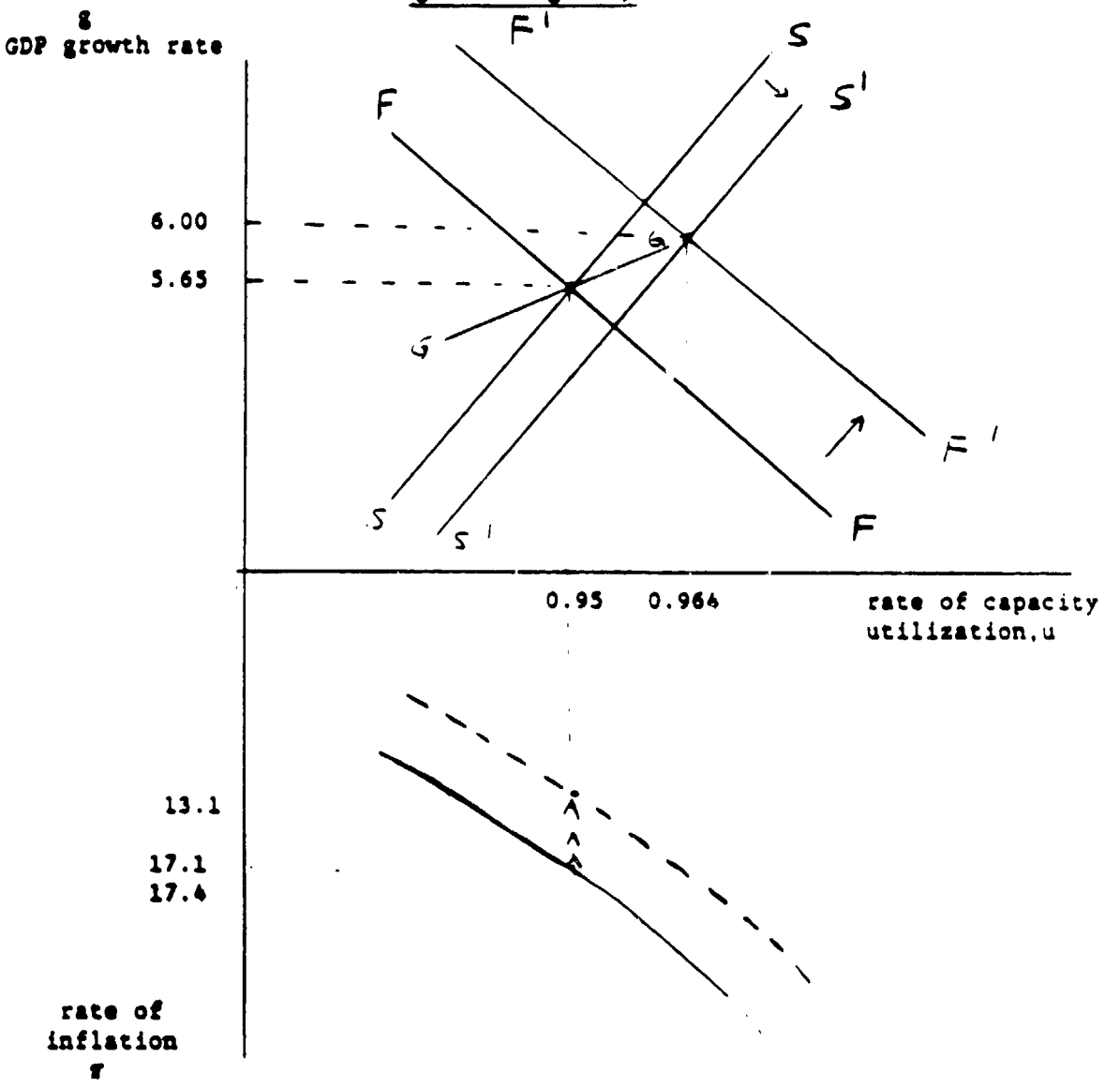


Figure 6. Effects of a reduction in the mark-up rate of 4 %. (demand constrained and inflationary growth regimes)



APPENDIX

In this appendix we shall present the initial values of some key variables as ratios of potential GDP of the base year, 1987. We include also the parameterized form of some relationships of the model that are not included in the main text (constant terms correspond tc adjusted values for the calibration year).

GDP growth rate: 0.055

rate of capacity utilization: 0.946

total consumption: 0.757

gross investment rate: 0.16

total exports: 0.31

total imports: 0.284

consumption goods imports: 0.096

intermediate goods imports: 0.13

capital goods imports: 0.059

resource surplus: 0.03

net factor payments abroad: 0.081

net current transfers: 0.0057

current account deficit: 0.045

national savings: 0.114

national private savings: 0.064

current government spending : 0.296

current government spending: 0.246

public savings: 0.05

public investment: 0.069

fiscal deficit : 0.019
(public sector
borrowing requirements)

growth -investment relationship

$$g = 0.0017 + 0.333\ i$$

imports of consumption goods

$$m_c = 0.035 - 0.146\ e_r + 0.218\ u$$

imports of intermediate goods

$$m_z = - 0.0958 - 0.0286\ e_r + 0.269\ u$$

imports of capital goods

$$m_k = 0.079 - 0.02\ e_r + 0.645\ i$$

total exports

$$x = - 0.191 + 0.191\ e_r + 0.319\ Y^*$$

private investment rate

$$i_p = 0.051 - 0.23\ i_g + 0.059\ u$$

average direct tax rate = 0.2

marginal saving rate = 0.2

Bibliography

Arellano, J.P. (1988), "Crisis y recuperación económica en Chile en los años 80" **Colección Estudios Cieplan** # 24, Junio.

_____ (1988), "La Inversión en Chile: Temas para los Años 90" **mimeo** Cieplan.

Banco Central de Chile (1988), **Boletín Mensual**, Various Issues.

Bacha, E. (1988), "A three-Gap Model of foreign transfers and the GDP growth rate of developing countries " **mimeo** University of California at Berkeley.

Cepal (1989), **Preliminary Overview of the Latin American Economy.** United Nations.

Corbo, V. (1985), "International Prices,Wages and Inflation in an Open Economy: A Chilean Model" **The Review of Economic and Statistics**, 4.

------ and A. Solimano (1990) " Chile's Experience with Stabilization Revisited" Paper Presented at the conference " Lessons of Economic Stabilization and its Aftermath", Jerusalem-Israel; February 1990.

Jadresic, E.(1985), "Formación de Precios Agregados en Chile: 1974-1985" **Colección de Estudios Cieplan** # 16, Junio.

Larraín, F. (Editor) 1988, **Desarrollo Económico en Democracia.** Ediciones Universidad Católica de Chile. Ch. 2.

_____ (1989), "Chile: The Challenges of Democratic Development" **mimeo** Harvard University.

Marfán, M. and P. Artiagoitía (1989) " Estimación del PGB Potencial: Chile 1960-1988" **Colección de Estudios Cieplan** # 27, Diciembre.

Meller, P. and A. Solimano (1987), "A Simple Macro Model for an Small Open Economy Facing a Binding External Constraint (Chile)" **Journal of Development Economics**, North-Holland, June.

Pollack, M. y A. Uthoff (1986), "Pobreza y Mercado del Trabajo: Aspectos conceptuales y Metodologia" Prealc, Santiago, Chile.

Rodriguez, J. (1985), **La Distribución del Ingreso y el Gasto Social en Chile** Ilades, Santiago -Chile.

Solimano, A. (1986), "Contractionary Devaluation in the Southern Cone: the Case of Chile," **Journal of Development Economics**, 23, North-Holland.

_____ (1987), "Emprego e Salários reais: uma análise macroeconômica de desequilibrio para o Chile e o Brasil" **Pesquisa e Planajamento Economico**, Dezembro, IPEA, Rio de Janairo, Brasil.

_____ (1988), "Política de Remuneraciones en Chile: Experiencia pasada Instrumentos y Opciones a Futuro" **Colección de Estudios Cieplan**. Diciembre, Santiago-Chile.

--------- (1989) How Private Investment Reacts to Changing Macroeconomic Conditions ? The case of Chile in the 1980s. **PPR Working Paper** # 212 The World Bank.

Taylor, L. (1988), "Notes on Growth Excercises" **mimeo**. M.I.T.

_____ (1988), "Real and Money Wages, Output and Inflation in the Semi-Industrialized World" **Working Paper** # , M.I.T.

Zucher, A. (1989), Comportamiento de la Inversión en Capital Fijo en Chile: 1974-1987. **Tesis de grado**. Instituto de Economia, Universidad Católica de Chile.

PRE Working Paper Series

	Title	Author	Date	Contact for paper
WPS373	Are Better-off Households More Unequal or Less Unequal?	Lawrence Haddad Ravi Kanbur	March 1990	J. Sweeney 31021
WPS374	Two Sources of Bias in Standard Partial Equilibrium Trade Models	Samuel Laird Alexander J. Yeats	February 1990	J. Epps 33710
WPS375	Regional Disparities, Targeting, and Poverty in India	Gaurav Datt Martin Ravallion	March 1990	C. Spooner 30464
WPS376	The World Economy in the Mid-1990s: Alternative Patterns of Trade and Growth	Colin I. Bradford, Jr.	March 1990	C. Evangelista 32645
WPS377	After the Cold War: Security for Development	John Stremlau	April 1990	C. Evangelista 32645
WPS378	How Does the Debt Crisis Affect Investment and Growth? A Neoclassical Growth Model Applied to Mexico	Patricio Arrau	April 1990	S. King-Watson 31047
WPS379	Some Implications of Policy Games for High Inflation Economies	Miguel A. Kiguel Nissan Liviatan	March 1990	R. Luz 39059
WPS380	Techniques for Railway Restructuring	Lee W. Huff Louis S. Thompson	March 1990	S. Shive 33761
WPS381	Trade in Banking Services: Issues for Multilateral Negotiations	Alan Gelb Silvia Sagari	March 1990	W. Pitayatonakarn 37666
WPS382	The Indonesian Vegetable Oils Sector: Modeling the Impact of Policy Changes	Donald F. Larson	March 1990	D. Gustafson 33714
WPS383	On the Relevance of World Agricultural Prices	Yair Mundlak Donald F. Larson	March 1990	D. Gustafson 33714
WPS384	The Rational Expectations Hypothesis in Models of Primary Commodity Prices	Christopher L. Gilbert	April 1990	A. Daruwala 33713
WPS385	The Principles of Targeting	Timothy Besley Ravi Kanbur	March 1990	J. Sweeney 31021
WPS386	Argentina's Labor Markets in an Era of Adjustment	Luis A. Riveros Carlos E. Sanchez	March 1990	R. Luz 39059
WPS387	Productivity and Externalities: Models of Export-Led Growth	Jaime de Melo Sherman Robinson	March 1990	M. Ameal 37947

PRE Working Paper Series

	Title	Author	Date	Contact for paper
WPS388	The Distortionary Effects of Tariff Exemptions in Argentina	Faezeh Foroutan	March 1990	S. Fallon 38009
WPS389	Monetary Cooperation in the CFA Zone	Patrick Honohan	March 1990	Wilai Pitayato-nakarn 37666
WPS390	Price and Monetary Convergence in Currency Unions: The Franc and Rand Zones	Patrick Honohan	March 1990	Wilai Pitayato-nakarn 37666
WPS391	Wealth Effects of Voluntary Debt Reduction in Latin America	Daniel Oks	April 1990	S. King-Watson 31047
WPS392	Institutional Development in World Bank Projects: A Cross-Sectional Review	Samuel Paul		
WPS393	Debt-for-Nature Swaps	Michael Occhiolini	March 1990	S. King-Watson 31047
WPS394	Threshold Effects in International Lending	Mark M. Spiegel		
WPS395	How Gambians Save — and What Their Strategies Imply for International Aid	Parker Shipton	April 1990	C. Spooner 30464
WPS396	Strategic Trade Policy: How New? How Sensible?	Max Corden		
WPS397	Antidumping Regulations or Procartel Law? The EC Chemical Cases	Patrick A. Messerlin		
WPS398	Agricultural Extension for Women Farmers in Africa	Katrine A. Saito C. Jean Weidemann		
WPS399	Macroeconomic Adjustment, Stabilization, and Growth in Reforming Socialist Economies: Analytical and Policy Issues	Andrés Solimano	April 1990	E. Khine 39361
WPS400	Macroeconomic Constraints for Medium-Term Growth and Distribution: A Model for Chile	Andrés Solimano	April 1990	E. Khine 39361
WPS401	Policing Unfair Imports: The U.S. Example	J. Michael Finger Tracy Murray	March 1990	N. Artis 38010